In the Claims:

Please amend claims 1, 8, 12, 16, 30, and 33, a cleaned-up version as Attachment A beginning at page i and a marked-up version of which is attached as Attachment B beginning at page vii.

REMARKS

In response to the Office Action mailed April 24, 2001, Examiner's comments and cited art have been studied. In the Office Action, claims 1-3, 6, 20-22, 24-27 and 29-34 have been rejected under 35 U.S.C. § 102(b) as anticipated by McManus. Claims 16 and 18 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Kerigan. Claims 4, 7-13 and 15 have been rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over McManus. Claims 5 and 14 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over McManus in view of Minato. Claim 17 and 19 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Kerigan in view of McManus. Claims 23 and 28 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over McManus in view of Sato. Applicants respectfully submit that the independent claims, as amended, and the dependent claims are allowable.

Supplemental Information Disclosure Statement

A supplemental information disclosure statement is enclosed for consideration.

Claim Amendments

Independent claims 1, 8, 12, 16, 30 and 33 have been amended to clarify the subject matter of Applicants' disclosed invention. In particular, these claims now recite systems and methods for storing monitor specific color information within a monitor during the monitor manufacturing process. Applicants request entry of these amendments.

§ 102 Rejections Under McManus

In the Office Action, claims 1-3, 6, 20-22, 24-27 and 29-34 have been rejected under 35 U.S.C. § 102(b) as anticipated by McManus. In view of the claim amendments and the following discussion, Applicants respectfully request reconsideration of these rejections.

McManus does not disclose, teach or suggest "coefficients to represent an input-output color characteristic" or "stor[ing] said plurarily of coefficients in a memory of said color display device. . . ." (Independent claim 1 and, similar in independent claims 8, 12, 16,

30 and 33.) Instead, McManus specifically discloses storage of memory intensive lookup tables, not "coefficients," or a mathematical representation, in a computer. (Col. 5:10-12) Even if it would have been an inherent to one of ordinary skill in the art to store coefficients or a mathematical representation as a part of the computing process, to which Applicants disagree, McManus directly proposes doing so in a computer not in a display device. These and other reasons strongly in favor of withdrawing the rejections are presented in detail below.

McManus' Look-up Table Storage Does Not Disclose of Applicants' Coefficients Storage

McManus fails to disclose, teach or suggest storing coefficients representing an input-output characteristic of a color display device. Its lookup table is not a set of coefficients. The objective in McManus is to obtain the lookup tables, not to obtain the coefficients themselves. It is clear that McManus' calculation of coefficients serves the interpolation function to "fill the gaps" of the values not specifically tested. In contrast, Applicants' calculated coefficients provide a compressed representation of the monitor's characteristics. Only after the manufacturing process when the monitor is "married" with a personal computer are the coefficients read by the computer.

The two are also not analogous given the memory requirements to store a look-up table. Specifically, the look-up table data stored by McManus contains intensity level data for every color value in the range of 0-255. (Col. 3:54-59 and col. 5:17-20.) Further, a separate look-up table is stored for each electron gun, corresponding to red, green and blue phosphor sets. (Col. 3:35-40 and col. 2:40-42.) Thus, McManus proposes a memory sufficient to store 256 bytes multiplied by three, or 2568 bytes. This amount of memory is simply not available in typical display memory (discussed in more detail below). Thus, because McManus proposes coefficient calculation for an interpolative, not compression, function to store an amount of data which exceeds available memory in a monitor, McManus does not disclose, teach or suggest Applicants' coefficient storage in display memory.

McManus Does Not Disclose Storing Coefficients in a Display Device Memory

Because McManus is a process occurring downstream from the manufacturing process (discussed below), McManus is simply not concerned with memory limitations associated with memory in a display device. Examiner states that it would be understood by one of ordinary skill that all process data used in McManus' calculations be associated with a particular display. However, this position ignores the very teaching of McManus which

proposes that the color correction information is "stored by the computer." (Col. 5:9-11.) Simply put, the memory available in the main computer 24 is not display device memory.

Applicants' disclosed subject matter is directed to, for example, a production line process illustrated in Figure 2 and Figure 3, which, when compared to the McManus disclosure, clearly illustrates the distinction between a test system or computer memory and memory associated with a monitor. Specifically, Applicants' Figure 2 illustrates a CPU control system 206 including the process step to write coefficients to the monitor's DDC memory. The monitor under test 200 is illustrated as containing DDC memory 214 separate and apart from the CPU control system 206. A similar setup is shown in Applicants' Figure 3, including a general purpose computer 304 and a color display device 300 containing data storage 302. In contrast, McManus focuses on generating the lookup tables which do not create a memory issue because of the vast data storage resources of the main computer 24, and not the more limited monitor memory. (Col. 5:1-20.) Further, it should be understood that memory for a computer such as McManus' main computer 24 is separate and distinct from memory for a monitor such as that clearly represented in Applicants' Figures 2 and 3. Thus, McManus teaches away from display device storage because it proposes lookup tables which are stored in a main computer and which stored lookup tables would exceed the memory resources associated with display device memory.

<u>McManus Does Not Disclose A Manufacturing Process</u>

McManus does not disclose, teach or suggest it's video monitor color control system occurring "during a color display device manufacturing process. . . ." (Independent claims 1, 8, 12, 16, 30 and 33). Instead, McManus discloses a <u>downstream</u> method to correct color display. This position is specifically supported by the McManus specification on three levels: (1) the available memory required to store the disclosed lookup tables is only available in a <u>user environment</u> (not during a manufacturing process), (2) McManus discloses after-the-fact correction to manufacturer specifications and (3) there is no disclosure otherwise in McManus to indicate a manufacturing process. As discussed above, McManus proposes calculating coefficients for a polynomial function describing true phosphor luminance characteristics of a particular monitor. (Col. 4:68-col. 5:9.) McManus then proposes use of the coefficients to create a lookup table which is then stored by the computer. (Col. 5:9-11.) These lookup tables further contain values for each data value between an upper limit (255) and a lower limit after a noise data deletion is made (approximately 25-30). (Col. 5:11-17.)

Memory capacity to store nearly 256 values *per* color, red, green and blue is not available in a display device. Specifically, display devices are typically manufactured

separate and apart from any accompanying driver device, such as a personal computer. Thus, the large resources associated with the personal computer are not available until after the monitor has been manufactured and then sent to the computer wholesaler, for example, which then "marries" the monitor with the PC or other monitor driver. At the time of the display device manufacture, the only storage that is commonly available is the memory located within the display device itself. This display memory typically consists of only 128 bytes, most of which is used for information associated with the display device such as its model number, serial number, its screen size and other display characteristics such as chromaticity characteristics and timing characteristics (which are not monitor specific). Thus, of the 128 bytes available in display memory, only a fraction of that is available for different uses. Applicants' coefficients can be easily stored in this limited color display memory and still, in a compressed manner, represent input/output color characteristics of the color display device. McManus simply does not address the memory constraints which exist at the time of the color display device manufacture. In fact, McManus teaches away from color management during the manufacturing process because McManus proposes data storage exceeding memory available at the time of display manufacture.

Second, McManus both specifically and implicitly describes its color management as a downstream or user process, not upstream during the display manufacture. Although McManus does discuss display manufacture, it does so only to reference that its process corrects the settings or characteristics specified by the manufacturer. Specifically, McManus mentions characteristics that are specified by the manufacturer. (Col. 5:59-60.) However, McManus discloses that an aspect of its invention is to correct those manufacturer specified characteristics to reflect a true phosphor luminance characteristics of the monitor. (Col.5:55-59.) In addition, McManus discusses configuration of electron guns that are over-biased during manufacture. (Col. 4:40-42.) McManus then proposes that because of this over-biasing during manufacture, it would be desirable to delete the low values which may be susceptible to noise. (Col. 4:43-45.) Each of these references discuss display manufacture as an upstream process, only to be corrected by McManus' proposed downstream corrective process. An additional reference which may implicitly support this downstream process is McManus' testing step size of five for obtaining its color characteristic. (Col. 3:49-53.) This step size of five over the range of 0-255, *per each color red, green and blue,* is not "rapid calibration" in a context of a manufacturing process. A standard principal of assembly line manufacture considers precision versus speed. Step sizes of significantly higher than five, i.e. such as the step size of 32, are commonly understood as achieving suitable precision compared to McManus' proposed much lower step size of 5. Thus, while a step site of 5

might be suitable in a downstream user or service environment, such precision testing is inefficient in a production line environment.

Finally, McManus simply does not address color correction in the context of occurring "during a color display device manufacturing process." Instead, McManus teaches away from a manufacturing process all together by disclosing only storage of lookup tables not the coefficients themselves. (Col.4:58-Col. 5:20.) As discussed above, the objective in McManus is to obtain the lookup tables, not to obtain the coefficients themselves. This is not surprising due to the fact that McManus is not directed to a manufacturing process at all. Instead, McManus proposes its color solution to be performed after the monitor has been delivered to a user, or at least a distributor or service personnel. A further distinction related to this point is that McManus requires such user or service personnel to have and operate sophisticated color equipment such as photometers and complex display control software. This is avoided by Applicants' manufacturing process.

The intervening step of storing coeffficents (not look-up tables) missing from McManus cannot be overlooked. Specifically, the absence of this step would lead one of ordinary skill in the art away from application of McManus to an environment having only limited memory resources. It is further notable that the flow chart of Figure 2 illustrating the McManus method does not disclose storage of coefficients at all, much less during the manufacturing process, but instead skips this intervening step all-together. In this way, McManus proposes to one skilled in the art to immediately generate lookup tables. Thus, because McManus proposes a process requiring an amount of memory not available during display manufacture, distinguishes manufacturing concepts from it's downstream correction process and does not otherwise disclose manufacturing considerations, Applicants respectfully request reconsideration of the rejections to the now amended independent claims.

Claim Language of Independent Claims 20 and 25 Has Not Been Addressed

In the Office Action, claims 20 and 25 and its dependent claims were rejected along with independent claims 1, 7, 8, 12, 16, 30 and 33. However, the Office Action does not specifically address the particular claim language of claims 20 and 25. Specifically, McManus does not disclose "a first brightness output" and "a second brightness output." The rejections to this claim language is no where supported in the Office Action. Further, McManus does not disclose display of "a maximum brightness" along with a second display which varies from minimum to maximum brightness. The rejections to this claim language are also not at all supported in the Office Action. Finally, McManus does not disclose "correlating" these elements to achieve "a mathematical representation of an input-output

transfer characteristic of the color display device." Here again, this rejection is not supported in the Office Action.

Applicants similarly traverse the rejection of claim 25. Specifically, McManus does not disclose a system which "correlates" a known maximum level of brightness output with a second varying color brightness color output to achieve "a mathematical representation of the input-output transfer characteristics of the display device." The rejection of this claim language is not supported in the Office Action.

102 Rejection Under Kerigan

In the Office Action, claims 16 and 18 are rejected under 35 U.S.C. § 102(e) as being anticipated by Kerigan. In light of Applicants amended claim 16 and the following comments, Applicants respectfully request this rejection be withdrawn.

At the outset, a brief discussion of Kerigan may be helpful. Kerigan is generally directed to a display apparatus having a data input that is switchable between a first data and a second data. (Abstract). Using jumper connections, Kerigan proposes a switching circuit which is capable of switching between a first and a second connection associated with the two data inputs. (Col. 3:12-18.) In this way, Kerigan proposes a system whereby two display inputs may be selectably input into a display apparatus through a switching circuit. Kerigan further proposes a display memory containing functional capabilities of the display device. The memory stores information which permits computer system to configure a display adapter which outputs RGB, horizontal and vertical picture signals. (Col. 6:5-12.) Kerigan is wholly unrelated to a color display device management method and apparatus occurring during the manufacturing process of the display device. Likewise, Kerigan is unrelated to "standardization of color brightness."

Kerigan does not teach or suggest a system that is concerned with data to "aide in the standardization" of color signals. The fact that Kerigan proposes display device related data does not anticipate Applicants' claimed color "standardization," much less "standardization of a color brightness." The sections cited in the Office Action at col. 2:5-6 are not related to standardization of color characteristics at all, but instead relate to various control settings such as horizontal and vertical synchronization, frequency and other preset control values. The sections cited in the Office Action merely disclose the type of information and control signals, that are sent to a display or a display driver that is required to produce a display output that is recognizable electronically by the display and visually to an end-user. Furthermore, there is no reference in the cited sections that Kerigan relates at all to color

brightness. The Office Action, in fact, does not cite one portion of Kerigan that even mentions the word brightness.

Finally, as the claims are now amended, Kerigan does not teach or suggest, or even relate to, a process that occurs during a display device manufacturing process. Instead from the figures, Kerigan proposes a system that is incorporated into an end-user arrangement whereby two data inputs can be selectively switched to a display device at a user location, not at a manufacturing process level. Thus, for these reasons and simply because Kerigan is directed to wholly different subject matter than Applicants' color brightness characterization occurring during a manufacturing process, Applicants respectfully request withdrawal of this rejection.

<u>103 Rejections Over McManus</u>

In the Office Action, claims 4, 7-13 and 15 have been rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over McManus. In view of the claim amendments, the above discussion and the below discussion, Applicants respectfully request withdrawal of these rejections. Essentially the Examiner has combined a 102 and a 103 argument citing inherency aspects for admitted shortcomings of McManus. These arguments are addressed in the discussion above under the heading "102 Rejections Under McManus." These above comments apply with equal force to the rejections under 103(a). The §103 rejections under McManus are respectfully traversed.

<u>Other Rejections Under §103</u>

Various combinations of McManus with Minato, Kerigan and Sato have been asserted in the Office Action to support rejections to the dependent claims. In view of the amendments to the independent claims and the discussion relating to claim language not addressed in the Office Action, Applicants assert that Minato, Kerigan and Sato are not further instructive on Applicants' independent claims. In fact, Applicants assert that their combination with McManus is improper for two reasons: (1) the Office Action does not provide a basis for a motivation to combine, (2) such combination is nowhere taught or suggested in any of the references as relating to Applicants' claimed subject matter and (3) Minato, Sato and Kerigan, in fact, are non-analogous subject matter. Specifically, as discussed above, Kerigan is related to selectively providing through a switch apparatus multiple data input to a display device and is unrelated to color brightness characterization occurring during a manufacturing process. Minato proposes a color correction scheme whereby a spectral component analyzer is used to compare a reference color with a displayed

desired color. (Abstract and Figure 3.) While Minato is related to color correction, Minato does so in a different manner than Applicants and does not occur during a manufacturing process. Finally, Sato proposes a cathode ray tube adjustment of convergence and distortion and is also unrelated to color brightness.

Further, the dependent claims not specifically addressed in the arguments above are allowable for at least the reason that the claims from which they depend are allowable.

CONCLUSION

For the foregoing reasons, Applicants submit that the application stands in condition for allowance. Withdrawal of the rejections and allowance of the claims is respectfully requested.

Respectfully submitted,

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ATTACHMENT B

Marked-Up Version Of Amended Claims (as of 6/28/01)

1. (ONCE AMENDED) A system for storing [computing] equation coefficients in a color display device during a color display device manufacturing process, said equation coefficients to represent an input-output color characteristic of the [a] color display device, said system comprising:

a signal generator for generating an output signal that can be used by [a] said color display device to produce a predetermined pattern on a screen of said color display device;

a general purpose computer coupled to said signal generator and said color display device, the general purpose computer providing during the color display device manufacturing process [providing] a plurality of first outputs to said signal generator such that said signal generator incrementally changes said output signal from a first extreme to a second extreme such that a first color can be displayed on said color display device in said predetermined pattern, said single color being displayed incrementally from a first brightness level to a second brightness level;

a photometer device positioned to measure the incremental brightness levels that can be displayed on said color display device, said photometer providing a brightness data for each incremental brightness level to said general purpose computer;

said general purpose computer correlates said first outputs with said brightness data to further calculate a plurality of coefficients that represent the signal input-to-first color output relationship of said color display device; and

said general purpose computer stores said plurality of coefficients in a memory of said color display device during the color display device manufacturing process.

8. (ONCE AMENDED) A method of calculating a mathematical representation of the signal input-to-color brightness output relationship of a color display monitor during a display device manufacturing process, said method comprising the steps of:

providing input signals having predetermined incremental changes between said input signals to a color display device during the display device manufacturing process such that said color display device produces a predetermined pattern on the color display device's screen;

measuring a brightness of at least a portion of said predetermined pattern at each incremental change of said input signal and providing said measured brightness as brightness data to a general purpose computer;

correlating said input signals with said brightness data in said general purpose computer;

calculating coefficients of a [polynomial] mathematical representation, in said general purpose computer, of said correlated input signals to said brightness data;

storing during the display device manufacturing process said coefficients in a memory device associated with said color display device.

12. (ONCE AMENDED) A color display device adapted to provide during a color display device manufacturing process a plurality of coefficients to a color display device driver circuit, said coefficients being related to a signal-input-to-brightness-output transfer function of said color display device, said color display device comprising:

input/output circuitry for connecting said color display device to a general purpose computer;

a display screen in communication with said input/output circuitry;

a data storage device, [in communication with said input/output circuitry] associated with the display screen, for storing, at least, a plurality of coefficients for a signal-input-to-brightness-output transfer function, said plurality of coefficients being calculated after incremental signals are provided to said color display [monitor] device, via said input/output circuit, such that a predetermined pattern is displayed on said display screen, a brightness data of said predetermined pattern is measured and correlated with each said incremental signal, a transfer function, having coefficients, is calculated based on said correlation of said incremental signals and said brightness data, said coefficients then being stored in said [memory] data storage device, said coefficients being available to a color display device driver circuit when said color display device is connected to a general purpose computer.

16. (ONCE AMENDED) A computer system comprising:

a general purpose computer, said general purpose computer comprising a color display device driver;

a color display device connected to said general purpose computer, said color display device comprising a data storage device containing [data that can be] a mathematical representation of an input-output transfer characteristic for the color display device stored during a color display device manufacturing process, said mathematical representation provided to said color display device driver in order to aide the standardization of a color brightness.

30. (ONCE AMENDED) A method of color management for a color display device, the method comprising the steps of:

generating during a color display device manufacturing process a mathematical model of a brightness transfer function describing a relationship between color input signals to a color display device and color brightness output of the color display device; and

storing a representation of the mathematical model in a memory device associated with the color display device.

33. (ONCE AMENDED) A color management system for a color display device, comprising:

a means for generating during a color display device manufacturing process a mathematical model of a brightness transfer function describing a relationship between color input signals to a color display device and color brightness output of the color display device; and

a means for storing a representation of the mathematical model in the color display device.